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RECENT BOOKS AND PAMPHLETS. — A Course of Practical Instruction in Elementary Biology. By T. H. Huxley, assisted by H. N. Martin. Second edition, revised. London and New York: Macmillan & Co. 1876. 12mo, pp. 279. $2.00.

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Recherches sur les Phénomènes de la Digestion et sur la Structure de l'Appareil digestif chez les Myriapodes de Belgique. Par Félix Plateau. Bruxelles. 1876. 4to, pp. 94.

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Note sur les Phénomènes de la Digestion chez la Blatte américaine (*Periplaneta Americana* L.). Par Félix Plateau. Bruxelles. 1876. 8vo, pp. 30.

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On the Anatomy and Habits of *Nereis virens*. By F. M. Turnbull. (From the Transactions of the Connecticut Academy, vol. iii. August, 1876.) 8vo, pp. 15. With three Plates.

Rambles of a Naturalist in Egypt and other Countries. By J. H. Gurney. London: Jarrold and Sons. 12mo, pp. 307.

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GENERAL NOTES.

BOTANY.[1]

ALFRED W. BENNETT ON THE GROWTH OF THE FLOWER-STALK OF THE HYACINTH. — (Abstract of a paper read before the Linnean Society, London, March, 1876.) In a paper read to the society at its meeting on November 4, 1875, Mr. Bennett gave some details in respect of the remarkably rapid growth of the flower-stalk of the female flower of *Vallisneria spiralis*. The general results arrived at were that the greatest "energy of growth" was displayed by the apical portion of the peduncle or that immediately beneath the flower-bud, the energy apparently decreasing regularly towards the base of the flower-stalk. As this appeared to be opposed to the law stated by Sachs and others to govern the rate of growth of the different successive internodes of an aerial stem, he was anxious to ascertain how far it was in accord with the relative rapidity of growth of different portions of a single elongated aerial internode. For this purpose he measured the growth of the common peduncle of the inflorescence of the hyacinth, with the following results in two specimens, one grown in a hyacinth-glass, the other in soil in a pot.

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[1] Conducted by PROF. G. L. GOODALE.

Specimen A, grown in a hyacinth-glass. This was first measured at noon on February 23d, when the peduncle, with a total length of 1.25 in., was divided into two equal portions of 0.625 in. At 10 A. M. on the 26th, when it had increased to 1.55 in., each of the two sections was again divided, the length of the four portions, proceeding from above downwards, being 0.35, 0.4, 0.4, and 0.4 in. Measurements were made twice and sometimes three times a day; and it was soon evident that the energy of growth of these different portions was very unequal. By ten P. M. on February 29th each of the three uppermost portions was still only 0.5 in. long, whilst the lowest had increased to 1.0 in. From this time the increased rapidity of growth of the lowest portion was still more marked. By ten P. M. on March 5th the lengths were respectively 0.9, 0.9, 0.85, and 2.35 in., and at ten P. M. on March 11th, when the growth had finally ceased, the measurements were 1.15, 1.0, 1.0, and 3.45 in., making a total of 6.6 in. The following is a complete table of the measurements: —

	A.	B.	C.	D.	Total.	Increase.
Feb. 26th, 10 A. M.	.35	.4	.4	.4	1.55	..
12 noon	.35	.4	.4	.45	1.6	.05
10 P. M.	.35	.4	.4	.5	1.65	.05
27th, 1 P. M.	.4	.4	.4	.55	1.75	.1
10 P. M.	.4	.4	.4	.55	1.75	.0
28th, 10 A. M.	.45	.4	.4	.65	1.9	.15
3 P. M.	.45	.4	.4	.7	1.95	.05
10 P. M.	.45	.45	.4	.75	2.05	.1
29th, 10 A. M.	.5	.45	.45	.8	2.2	.15
3 P. M.	.5	.5	.45	.95	2.4	.2
10 P. M.	.5	.5	.5	1.0	2.5	.1
March 1st, 10 A. M.	.55	.55	.5	1.2	2.8	.3
10 P. M.	.6	.55	.5	1.25	2.9	.1
2d, 10 A. M.	.65	.6	.55	1.3	3.1	.2
6 P. M.	.7	.65	.55	1.35	3.25	.15
3d, 10 A. M.	.75	.65	.6	1.5	3.5	.25
3 P. M.	.75	.7	.6	1.7	3.75	.25
10 P. M.	.8	.7	.6	1.9	4.0	.25
4th, 10 A. M.	.8	.75	.75	2.2	4.5	.5
10 P. M.	.85	.8	.8	2.3	4.75	.25
5th, 10 A. M.	.85	.8	.8	2.3	4.75	.0
10 P. M.	.9	.9	.85	2.35	5.0	.25
6th, 10 A. M.	.95	.9	.9	2.5	5.25	.25
10 P. M.	1.0	.9	.9	2.7	5.5	.25
7th, 10 A. M.	1.0	.9	.9	2.75	5.55	.05
10 P. M.	1.0	.9	.95	2.9	5.75	.2
8th, 10 A. M.	1.05	.9	1.0	3.0	6.0	.25
10 P. M.	1.1	1.0	1.0	3.15	6.25	.25
9th, 10 A. M.	1.1	1.0	1.0	3.2	6.3	.05
11 P. M.	1.15	1.0	1.0	3.25	6.4	.1
10th, 10 A. M.	1.15	1.0	1.0	3.4	6.55	.15
10 P. M.	1.15	1.0	1.0	3.45	6.6	.05
11th, 10 A. M.	1.15	1.0	1.0	3.45	6.6	.0

It will be seen from the above table that by far the greatest total energy of growth was displayed by the lowest of the four segments, which increased during the twelve days between February 26th and March 10th from 0.4 to 3.45 in., or 762.5 per cent. of its original length. The next greatest energy, but at a great interval, was exhibited by the apical section, which increased from 0.35 to 1.15, or 228 per cent., while the two central portions exhibited the least activity, increasing only from 0.4 to 1.0, or 150 per cent. of their original length.

Specimen B, grown in a pot. In the second example, the evidence was still more conclusive that the growth of the peduncle is mainly basilar. On February 26th, the flower-stalk, then an inch in length, was divided into two equal portions of 0.5 in. On the next day, when it had increased to 1.1 in., the lowest zone of 0.1 in. was marked off separately. By ten P. M. on February 29th this lowest zone (C+D) had increased to 0.7 in., or by 600 per cent. of its original length, while the two uppermost zones were still respectively only 0.55 and 0.5 in. long. The lowest zone was then again divided into two portions, the upper one being 0.5 and the lower 0.2 in. long. By ten P. M. on March 3d the lengths of the four zones, commencing from the top, were 0.8, 0.8, 0.75, and 0.75 in., giving a total of 3.1 in. At ten P. M. on the 7th, the total length of 6.5 in. was distributed thus: 1.6, 1.5, 1.25, and 2.15 in.; and at ten A. M. on the 13th, when the final length of 8.2 inches had been attained, the measurements were respectively 2.2, 1.75, 1.5, and 2.75 in. The following is the complete table: —

		A.	B.	C.	D.	Total.	Increase.
Feb. 26th,	9 A. M.	.5	.5	..	..	1.0	..
	10 P. M.	.5	.5	..	..	1.0	.0
27th,	1 P. M.	.5	.55	..	..	1.05	.05
	10 P. M.	.5	.5	.1	..	1.1	.05
28th,	9 A. M.	.5	.5	.2	..	1.2	.1
	3 P. M.	.5	.5	.2	..	1.2	.0
	10 P. M.	.5	.5	.2	..	1.2	.0
29th,	9 A. M.	.55	.5	.45	..	1.5	.3
	10 P. M.	.55	.5	.5	.2	1.75	.25
March 1st,	10 A. M.	.55	.55	.5	.3	1.9	.15
	10 P. M.	.6	.55	.55	.3	2.0	.1
2d,	9 A. M.	.6	.6	.55	.4	2.15	.15
	6 P. M.	.65	.6	.55	.5	2 3	.15
3d,	10 A. M.	.65	.65	.65	.6	2.55	.25
	3 P. M.	.75	.75	.65	.65	2.8	.25
	10 P. M.	.8	.8	.75	.75	3.1	.3
4th,	10 A. M.	.9	.9	.8	1.1	3.7	.6
	10 P. M.	.9	.9	.85	1.25	3.9	.2
5th,	10 A. M.	1.0	1.0	1.0	1.25	4.25	.35
	10 P. M.	1.05	1.1	1.1	1.25	4.5	.25
6th,	10 A. M.	1.2	1.25	1.1	1.55	5.1	.6
	10 P. M.	1.35	1.3	1.2	1.75	5.6	.5
7th,	10 A. M.	1.5	1.5	1.25	1.85	6.1	.5
	10 P. M.	1.6	1.5	1.25	2.15	6.5	.4
8th,	10 A. M.	1.65	1.5	1.25	2.15	6.55	.05
	10 P. M.	1.7	1 55	1.35	2.15.	6.75	.2

	A.	B.	C.	D.	Total.	Increase.
9th, 10 A. M.	1.85	1.6	1.4	2.15	7.0	.25
11 P. M.	2.0	1.65	1.4	2.35	7.4	.4
10th, 10 A. M.	2.0	1.65	1.4	2.45	7.5	.1
10 P. M.	2.0	1.65	1.4	2.45	7.5	.0
11th, 10 A. M.	2.0	1.65	1.45	2.55	7.65	.15
12th, 10 A. M.	2.15	1.7	1.5	2.75	8.1	.45
10 P. M.	2.15	1.7	1.5	2.75	8.1	.0
13th, 10 A. M.	2.2	1.75	1.5	2.75	8.2	.1
10 P. M.	2.2	1.75	1.5	2.75	8.2	.0

Starting from the measurement at ten P. M. on February 27th, the lowest of the three zones, which then measured 0.1 in., had increased by March 13th so as to make up the two zones C and D together 4.25 in., or 4150 per cent. of its original length, while the remainder had only increased from 1.0 to 3.95, or at the rate of 295 per cent. Again, starting from ten P. M. on March 29th, when the four zones were first marked off, the ultimate increase of the lowest was from 0.2 to 2.75 in., or 1275 per cent.; the next greatest energy was displayed by the uppermost, which increased from 0.55 to 2.2, or just 300 per cent.; next came the second zone from the top, which showed an increase from 0.5 to 1.75, or 250 per cent.; and finally the third from the top, showing an increase from 0.5 to 1.5 in., or exactly 200 per cent. The rate of growth was again subject to great irregularities, which were no doubt attributable mainly to changes in temperature. Making the division between day and night as before at ten A. M. and ten P. M., the total amount of growth was again not very different in the two; but instead of being, as in the previous case, slightly in favor of the day, was rather more decidedly in favor of the night; of the 6.5 in. growth from February 29th to March 13th, 3 inches was by day, and 3.5 inches by night.

It will therefore be seen that, as far as these observations on the relative growth of different portions of the same internode go, they are entirely in accord with the statement of Professor Sachs, in regard to that of different internodes on the same branch, that the maximum energy of growth is exhibited at a period considerably below the *punctum vegetationis*, though it is here much nearer the base than in the cases measured by Sachs. This brings out into still stronger relief the opposite phenomenon displayed by the elongated submerged flower-stalk of *Vallisneria*, the energy of growth of which is manifested mainly in the apical portion. The elongation of the peduncle of the hyacinth continues considerably after the complete expansion of the flowers, until the lowest in the raceme begin to fade.

These observations differ in several points from those on the flower-stalk of the hyacinth recorded by Münter in the *Botanische Zeitung* for February 24, 1843. He describes its growth as not centrifugal, like that of most flower-stalks, but centripetal; that is, it ceases to grow first near the flower and finally at the base. It will be seen that Mr. Bennett's two experiments agree in this, that while the energy of growth is greatest in the basal portion, the apical portion continues to grow for very nearly or quite as long. The growth of the flower-stalk of *Pelargonium* he describes, on the other hand, as centrifugal, the growth of each zone ceasing before the one next above it.

With regard to the relative amount of growth by day and by night, Münter also gives no measurements, but states that in the daytime the plant grows at first five times, then four times, and then three times stronger than by night. This differs materially from the general law as stated by Sachs (Text-Book, English edition, page 749), that "the plant will, according to circumstances, sometimes grow more quickly by day, sometimes by night, without exhibiting any exactly recurrent periodicity," the difference, however, being never so great as that stated by Münter. Mr. Bennett's observations are more in accordance with this.

BOTANICAL PAPERS IN RECENT PERIODICALS. — *Comptes rendus*, No. 4. Trécul, Theory of Metamorphosis of Branches for Diverse Functions. Decaisne, Note on *Cedrela Sinensis.* Henneguy, On Reproduction in Volvox. No. 5. Trécul, On *Mentzelia.* J. Joubert and Chamberland, On Fermentation in Fruits kept in Carbonic Acid. Durin, On Cellulosic Fermentation. Béchamp, On the Microzymas of Germinating Barley and of Sweet Almonds, as producing Diastase and Synaptase. No. 6. Renault, On *Neuropteris.*

Flora, No. 22. Weiss, On the Relations of Growth, and the Course of Fibro-Vascular Bundles in *Piperaceæ.* (Continued also in Nos. 23 and 25.) No. 23. De Thümen, Fungi of South Africa. Nylander, On Certain Lichens in Mr. Wright's Cuban Collection (40 new species). No. 24. Dr. Christ, of Basel, Varieties of *Rosa.* Geheeb, Notes on Mosses.

Botanische Zeitung, No. 35. H. Hoffmann, Experiments in the Cultivation of Varieties. (Continued in No. 36.) V. Vesque-Püttlingen, On the Periodicity of the Currents in Protoplasma.

ZOÖLOGY.

THE PILOT FISH. — Eleven years ago, while on a voyage from India to this country, we were beset by many calms while crossing the "line." On one of these occasions, while some of the passengers were amusing themselves looking over the stern of the vessel, two beautiful pilot fishes (Naucrates?) were seen, and soon after a portion of an unusually large shark. Immediately a hook baited with salt pork was thrown overboard. When it touched the water these pilot fishes were seen to approach it, and then suddenly dart under the vessel. Soon a very large shark appeared and received the bait. As soon as safely secured the sailors drew him on deck. When a suitable opportunity was given for examining him, these two pilot fishes were seen attached to the body. At what particular portion they attached themselves I am unable to state. They were removed and placed in a bucket of salt water, where they swam about as if nothing had happened. — A. H. BURNELL.